Multiple Choice Questions

1. Which theorem locate an interval in which the real root of an equation $f(x)$ lies.

   (a) Mean value theorem
   (b) Rolls theorem
   (c) Lagranges theorem
   (d) Intermediate value theorem

2. In which interval the real root of the equation $x^2 - \log_e x - 12 = 0$ lies.

   (a) $(0, 1)$
   (b) $(2, 3)$
   (c) $(3, 4)$
   (d) $(1, 2)$

3. The rate of convergence of bisection method is

   (a) Linear
   (b) Quadratic
   (c) Cubic
   (d) None of the above

4. The rate of convergence of secant method is

   (a) 1.618
   (b) 1.168
   (c) 1.816
   (d) 1.268

5. The rate of convergence of Newton Raphson method is

   (a) 1
   (b) 2
   (c) 3
   (d) 4

6. Which method has a faster rate of convergence to the root of the equation

   (a) Bisection method
   (b) Secant method
   (c) Newton Raphson Method
   (d) Iteration method

7. In fixed point iteration method to find out the root of the equation $f(x) = 0$ we write $f(x)$ in the form $x = \varphi(x)$. The function $\varphi(x)$ must satisfies which condition in (a, b) the interval in which the root of the equation $f(x)$ lies.

   (a) $|\varphi(x)| < 0$
   (b) $|\varphi'(x)| < 0$
   (c) $|\varphi(x)| > 0$
   (d) $|\varphi'(x)| > 0$

8. In SOR method the coefficient matrix **A** must be

(a) Symmetric and positive definite
(b) Skew symmetric and positive definite
(c) Only symmetric
(d) Only skew symmetric

9. In Cholesky's method the co-efficient matrix **A** is

(a) Skew symmetric
(b) Symmetric
(c) Orthogonal
(d) None of the above

10. In SOR method the relaxation parameter ω lies in the interval

(a) $0 < \omega < 3$
(b) $\omega > 2$
(c) $0 < \omega < 2$
(d) $-1 < \omega < 1$

11. In crouts method the coefficient matrix **A** can be written as the product of a

(a) Lower and upper triangular matrix
(b) Unit lower and upper triangular matrix
(c) Unit lower and unit upper triangular matrix
(d) Lower and unit upper triangular matrix

12. In Dolitte method the coefficient matrix **A** can be written as the product of

(a) Lower and upper triangular matrix
(b) Unit lower and upper triangular matrix
(c) Lower and unit upper triangular matrix
(d) Unit lower and unit upper triangular matrix

13. Which method has a greater rate of convergence for solving a system of linear equations?

(a) Gauss Jacobi method
(b) Gauss Seidel method
(c) SOR method
(d) None of these

14. Which interpolation method is used for equal intervals?

(a) Lagranges method
(b) Newton divided difference
(c) Newton forward
(d) None of these

15. Which interpolation method is used for unequal intervals?

(a) Lagranges method
(b) Newton backward
(c) Newton forward
(d) None of these

16. Let $f(0) = 1, \quad f(1) = 3, \quad f(3) = 55$, then the value of $l_0(x)$ is

(a) $\frac{1}{3}(x-1)(x-3)$
(b) $-\frac{1}{3}x(x-3)$
(c) $\frac{55}{6}x(x-1)$
(d) None of these

17. Let $f(0) = 1, \quad f(1) = 3, \quad f(3) = 55$, then the value of $f[0,1,3]$ is

(a) 2
(b) 26
(c) 8
(d) 10

18. One function has how many number of interpolating polynomials

(a) More than 1
(b) Exactly 1
(c) ∞
(d) None of these

19. For three points the degree of the interpolating polynomial is less tan or equals to

(a) 1
(b) 2
(c) 3
(d) 4

20. Let $f(x) = \frac{1}{x}$ the $f[x_0, x_1]$ is

(a) $\frac{1}{x_0 x_1}$
(b) $\frac{1}{x_0}$
(c) $\frac{1}{x_1}$
(d) $-\frac{1}{x_0 x_1}$